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ABSTRACT

The generality of academic self-efficacy judgments was compared between groups of students with different personal characteristics, using the sample drawn from a previous study (M. Bong, 1997) (n=383). Confirmatory factor analyses showed that boys demonstrated more comparable strengths of self-efficacy across the academic domains compared to girls, who distinguished between their verbal and math efficacy more clearly. Hispanic students made a clearer distinction between their Spanish efficacy and their self-efficacy in other verbal subjects compared to their non-Hispanic peers. In addition, students who belonged to advanced placement classes demonstrated more conservative generality of their academic self-efficacy judgments than those from regular classes. It appears that students make more context-specific judgments of their academic self-efficacy as they gain increased expertise in the academic domain. (Contains two figures and nine references.) (Author/SLD)

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Personal Factors Affecting the Generality of Academic Self-Efficacy Judgments: Gender, Ethnicity, and Relative Expertise

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Abstract

The generality of academic self-efficacy judgments was compared between groups of students with different personal characteristics, using the sample drawn from a previous study (Bong, 1997). Confirmatory factor analyses showed that boys demonstrated more comparable strengths of self-efficacy across academic domains compared to girls, who distinguished between their verbal and math efficacy more clearly. Hispanic students made a clearer distinction between their Spanish efficacy and their self-efficacy in other verbal subjects compared to their non-Hispanic peers. In addition, students who belonged to advanced-placement classes demonstrated more conservative generality of their academic self-efficacy judgments than those from regular classes. It appears that students make more context-specific judgments of their academic self-efficacy as they gain increased expertise in the given academic domain.

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Many studies have now documented ample evidence attesting to the importance of academic self-efficacy in initiating and sustaining the level of motivation and various achievement-oriented behaviors (e.g., Bandura & Schunk, 1981; Pintrich & De Groot). Compared to the generous number of studies that investigated the relationship of academic self-efficacy to achievement, research on the relations among efficacy perceptions in diverse academic areas has been scarce (see Pajares, 1996). A recent investigation on the generality of academic self-efficacy showed that students hold more or less comparable judgments of their academic capability within the boundary each school subject (Bong, 1997). Perhaps more interesting, the generality of academic self-efficacy perception differed significantly across individual students.

Self-efficacy is a context-dependent construct (Zimmerman, 1996) and as such, a person's self-efficacy judgments and their generality are inevitably influenced by task-related variables as well as personal and contextual factors. Bong (1997) showed that students' efficacy perceptions became more similar as they reported perceiving greater similarity among sets of academic tasks. The generality of academic self-efficacy judgments may also depend on personal attributes. Unraveling the effects of and complex inter-relatedness among task and personal variables that wield influence on the generality of academic self-efficacy has important practical implications. As Pajares (1996) noted in his recent review of the academic self-efficacy literature, we first need to understand the factors and contexts that help or impede students' academic self-efficacy generalization in order to devise effective instructional strategies aiming at producing confident as well as competent learners.

The present investigation examined the role of personal factors such as gender, ethnicity, and expertise in determining the generality of academic self-efficacy judgments. Specifically, the following research questions were explored: (a) Do boys and girls differ in the generality of their academic self-efficacy perceptions? (b) Do students with Hispanic origin indeed demonstrate less generality between their Spanish self-efficacy and other English-based verbal efficacy perceptions compared to their non-Hispanic counterparts? and (c) Are there different degrees of generality between students who belong to advanced-placement (AP) classes in each domain and those who belong to regular classes?

Method and Procedures

From the 588 students from four Los Angeles-based high schools who participated in the previous study (Bong, 1997), 383 students with achievement indexes comprised the sample for the present study. Students reported their confidence for solving seven representative problems in six school subjects (i.e., English, Spanish, American history, algebra, geometry, and chemistry) and (b) their grade point averages in the six school subjects. Comparison of preliminary results on the generality of academic self-efficacy judgments revealed a similar pattern between the total and final samples.

Results and Discussion

Six first-order confirmatory factor analysis (CFA) models that specified different degrees of generality were fitted to each data set separately in order to compare the generality of efficacy perceptions between groups. When the fit of any first-order model was satisfactory (i.e., Bentler-Bonnett nonnormed fit index [NNFI] and comparative fit index [CFI] $\geq .90$), a second-order model structure was imposed to test further generality.

Effects of Gender

For both boys and girls, only Models 4, 5, and 6 demonstrated satisfactory fit to the data. To test for greater generality, four second-order model structures were imposed. For boys, Models B, C, and E demonstrated acceptable fit. Only Model E displayed good fit to the data for girls. Therefore, boys' perceptions of their academic capability appeared to be more domain-general compared to those of girls. Examination of correlations among six first-order factors showed that, with few exceptions, boys' efficacy ratings correlated more highly between subjects. In particular, boys assessed their academic capability in algebra and geometry as almost identical (.93), whereas girls judged their algebra and geometry self-efficacy less similar (.85).

Effects of Ethnicity

Students with Hispanic origin proved to make a clearer distinction between their perceived competence in English-based subjects and that in Spanish compared to their non-Hispanic counterparts. There were virtually no difference in fit between the two groups when models postulated a separate self-efficacy factor for each of the three verbal subjects (i.e., English, Spanish, and US history). However, when models specified only two verbal factors, Verbal-English and Verbal-Spanish, slightly better fit was obtained in the Hispanic sample. Evidence from correlation coefficients also corroborated that Hispanic students differentiated their English and Spanish self-efficacy more clearly compared to non-Hispanic students. A correlation coefficient between Spanish and English Academic Self-Efficacy was nonsignificant -.04 in the Hispanic sample but .30 in the non-Hispanic sample. Spanish and History Academic Self-Efficacy showed a nonsignificant correlation (.08) in the Hispanic sample compared with .36 in the non-Hispanic sample. Relations of the Spanish Academic Self-Efficacy factor with other non-verbal factors were also considerably stronger for the non-Hispanic sample. Evidently, Hispanic students distinguished their personal convictions in Spanish from their perceived capability to function in other academic domains. Non-Hispanic students appeared to make relatively liberal generalization of their academic self-efficacy across different domains including Spanish, expressing more comparable self-efficacy judgments across the six school subjects.

Effects of Expertise

Students were divided into two groups (i.e., AP and regular) both in verbal and math domains. Results showed a wide gap between the AP and regular-class groups in the generality of their academic self-efficacy perceptions. Across verbal and math domains, AP students were associated with more conservative, or significantly less, generality of efficacy judgments compared to students in regular classes. The trend is so strong that none of the second-order CFA models fit the data well in the AP sample, whereas almost all of them exhibited acceptable fit to the empirical data in the regular-class sample. Factor correlations showed that AP students made clearer differentiation between their verbal and math self-perceived capability than regular-class students. Interestingly, AP-math students judged their competence in algebra and geometry as more similar than regular-math students. Correlations between the chemistry efficacy factor and other math factors were appreciably smaller for the AP-math sample than the non-AP sample. Similar trends were observed when the dichotomy was conducted in the verbal domain. Overall, results clearly demonstrated that students with higher achievement levels do not

generalize their self-efficacy judgments in the area as much as those with lower achievement levels. Presumably, as one gains more knowledge and expertise in the domain, he or she makes more accurate assessment of task demands and characteristics, and this leads to more conservative generalization of their perceived efficacy. The results are in line with findings from studies that employed expert-novice paradigm that people with more expertise can discern structural similarities and differences among tasks more accurately than novices in the field (e.g., Chi, Feltovich, & Glaser, 1981).

To summarize, boys demonstrated more comparable strengths of confidence across different academic domains. Girls more clearly distinguished between their perceived verbal and math academic capability compared to boys. This finding may be reflecting boys' overestimation of their verbal competence compared to girls. Lundeberg, Fox, and Puncochar (1994), for example, reported that although both college men and women in their study often overestimated their chances of being correct on a given problem, men were typically more overconfident than women. Comparison of achievement indexes showed that girls participated in the present investigation were associated with significantly better performance in English and Spanish compared to boys. There was no statistically significant difference between boys' and girls' achievement in other school subjects. However, boys, instead of girls, provided significantly stronger self-efficacy judgments in US history.

Research on gender difference tells us that boys feel generally more confident in math-related subjects than girls, over and above what could be explained by achievement differences in the corresponding areas (e.g., Betz & Hackett, 1981). This was not evidenced in the current investigation. Boys and girls provided comparable confidence ratings in all three quantitative subjects. Moreover, boys, not girls, reported significantly stronger academic self-efficacy beliefs in US history. It should be noted that studies demonstrating traditional gender differences in academic self-concept or even in academic self-efficacy used measures that were more or less global compared to the problem-specific self-efficacy assessment employed in the current investigation. In fact, studies that assessed students' academic self-efficacy beliefs with similar specificity to the present one failed to find typical male math-superiority or female verbal-superiority that were beyond the effect of corresponding achievement differences (e.g., Skaalvik, 1990).

Consistent with the initial hypothesis (Bong, 1997), students with Hispanic origin proved to make a clearer distinction between their perceived competence in Spanish and that in other verbal and non-verbal subjects compared to their non-Hispanic peers. Hispanic students' Spanish self-efficacy stood out as it demonstrated nonsignificant relations with their self-efficacy judgments in all other school subjects. Apparently, they brought in more than school-based experiences when judging their academic confidence in Spanish. These findings offer persuasive evidence of personal factors operating on academic self-efficacy judgment.

The present findings especially shed light on the role of knowledge in academic self-efficacy formation. Second-order models positing a general self-efficacy factor underlying diverse academic domains could not successfully reproduce the interrelationships among the AP students' subject-specific self-efficacy perceptions. In other words, AP students' self-efficacy ratings contained more subject-specific

components than could be explained by a single higher-order factor. On the contrary, a single general factor was often sufficient for representing the relationships observed among subject-specific efficacy ratings of the regular-class students. This finding holds across verbal and math domains.

Correlations among subject-specific self-efficacy judgments of the AP- and regular-class students revealed some interesting patterns. In both verbal and math domains, AP students expressed more differentiated perceptions of confidence compared to their regular-class counterparts. In the math domain, however, a notably higher correlation was obtained for AP students between their algebra and geometry self-efficacy than for regular students. It is particularly interesting because AP-math students showed relatively stronger distinction between their self-judged capability to perform math and chemistry compared to non-AP students, who expressed more similar strengths of confidence between those two areas.

Studies with the expert-novice paradigm demonstrated that people with more expertise in the domain tend to categorize tasks by their structural features (e.g., Chi, Feltovich & Glaser, 1981). Experts, compared to novices, can make accurate distinctions among superficially analogous tasks according to the required underlying principles. Novices' understandings of tasks, on the other hand, are easily swayed by salient surface-level characteristics. In the current study, students in various AP classes who were expected to possess relatively superior skills and knowledge in the respective school subjects demonstrated considerably less generality of efficacy than their regular-class peers. Presumably, as one gains more knowledge and expertise in the domain, he or she makes more accurate assessment of task demands and characteristics that leads to clearer distinction between their subjective competencies. Unfortunately, such a claim is only speculative at the moment because there is no corroborating empirical evidence. The major limitation of the present study is, therefore, the lack of performance scores based on the same set of problems used to assess students' academic self-efficacy beliefs. If such data had been available, testing for the comparative accuracy of students' self-efficacy ratings would have been possible.

Students who belonged to one or more of the AP-math classes appeared to consider algebra and geometry as requiring basically the same skills and felt equally competent in performing the two types of tasks. Those from the regular-math classes more clearly distinguished their competencies in the two subjects. It is suspected that students with less experience or less expertise in math might have perceived algebra and geometry problems as more different than warranted because of salient problem features (e.g., presentation of a figure in geometry, but not in algebra, problems). Again, with no performance information, we cannot know for sure whether the differing generality between the AP and regular students were actually due to their superior (or inferior) ability to make accurate and realistic assessment of task demands. Experimental evidence is desperately needed which can demonstrate that manipulation of task similarity indeed influences transfer of academic self-efficacy beliefs.

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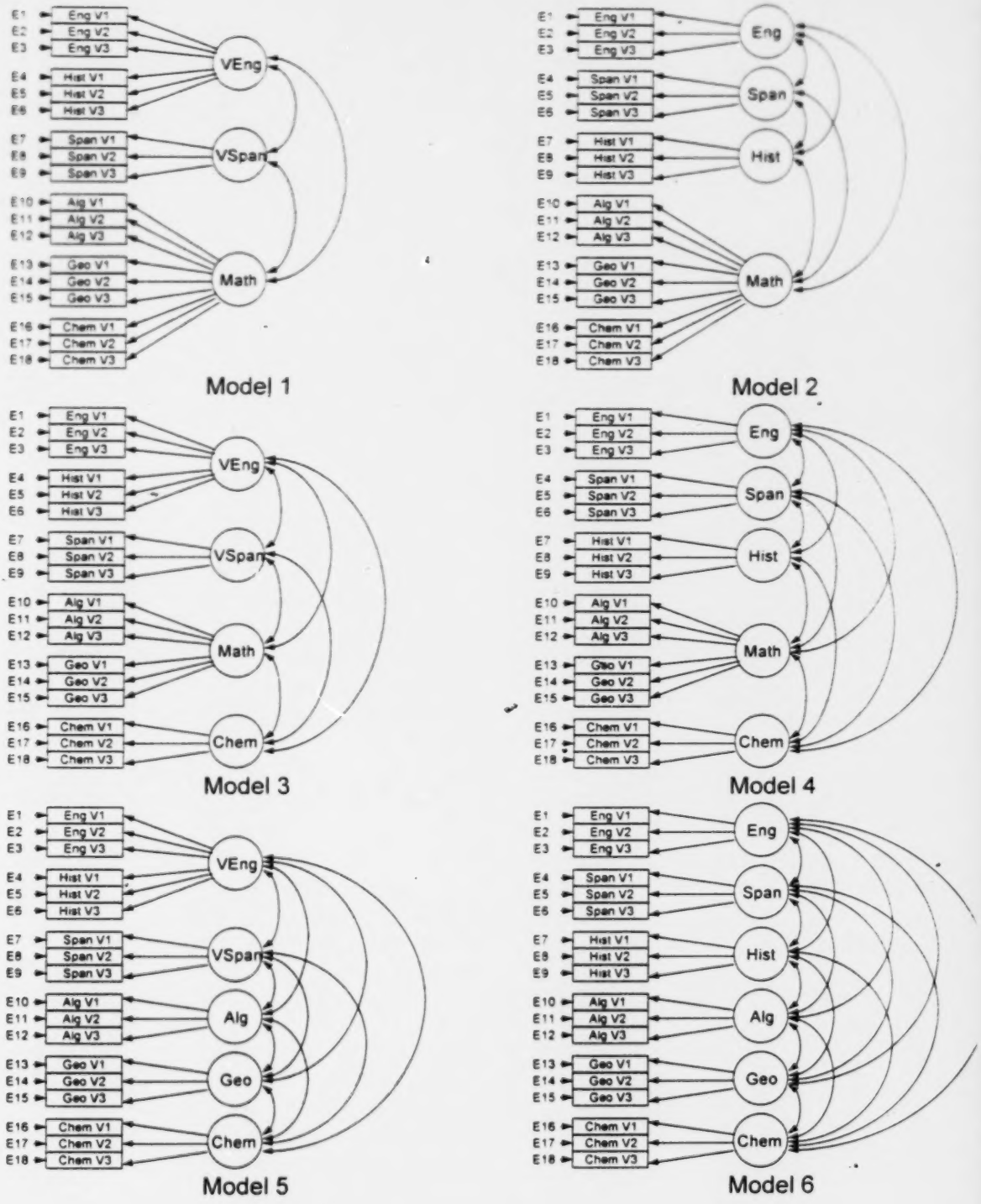

Figure 1. Structures of first-order factor models tested. Eng = English; Span = Spanish; Hist = US history; Alg = algebra; Geo = geometry; Chem = chemistry; VEng = Verbal-English; VSpan = Verbal-Spanish.

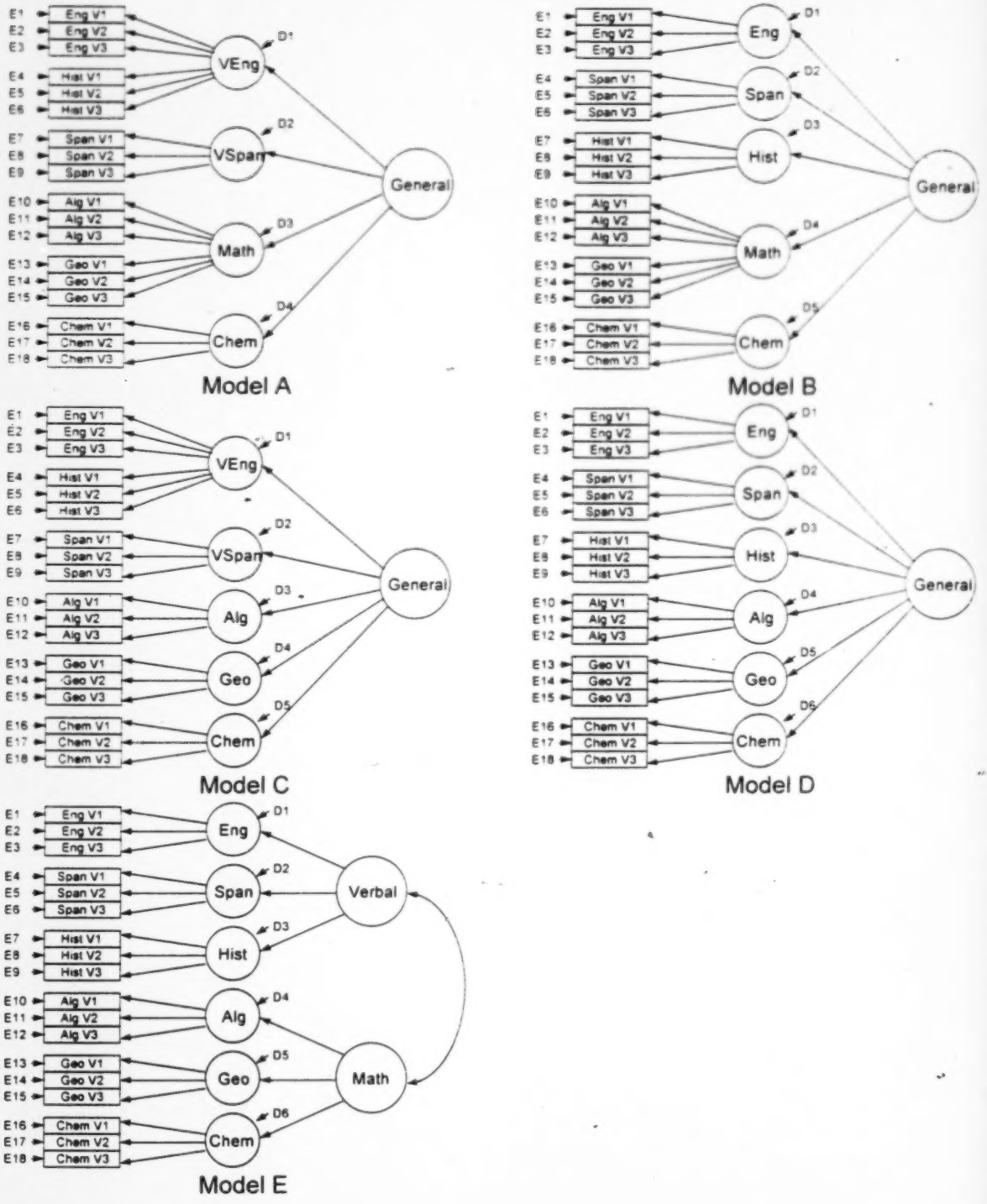

Figure 2. Structures of second-order factor models tested. Eng = English; Span = Spanish; Hist = US history; Alg = algebra; Geo = geometry; Chem = chemistry; VEng = Verbal-English; VSpan = Verbal-Spanish.